Enhanced MRI Predicts Ca Treatment Outcome

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DENVER — Assessment of tumor microvasculature by dynamic contrast–enhanced MRI permits early prediction of treatment outcome in patients with advanced cervical cancer, Nina A. Mayr, M.D., said at the annual meeting of the American Society for Therapeutic Radiology and Oncology.

These dynamic contrast–enhanced (DCE) MRI parameters provide significant added predictive value beyond the current preferred clinical prognostic factors, which are tumor stage, histology, and nodal status. Indeed, the MRI tumor microvasculature data permit prediction of treatment failure as early as 2 weeks into chemoradiation therapy, enabling physicians to alter treatment at midcourse in predicted poor responders, said Dr. Myer, director of the division of radiation oncology at Ohio State University, Columbus.

DCE MRI assesses both the structure and function of tumor microvasculature, particularly at the level of the capillary arterioles and in the extracellular interstitial space. Dr. Mayr has been instrumental in developing DCE MRI as a noninvasive prognostic tool for advanced cervical cancer. The clinical prognostic factors physicians have traditionally relied upon, she stressed, simply aren't informative enough.

"There's still a fair amount of variability with tumor stage and node status. Really, in the individual patient, response remains unknown. And once treatment fails, after-the-fact options are very limited," she said.

Dr. Mayr reported on 62 patients with stage IIB-IV disease that was treated with chemoradiation. They underwent DCE MRI studies before treatment, then at 2 weeks into therapy after receiving 20-25 Gy of radiation, and midway through therapy after having received 45-50 Gy. Mean follow-up was 3.5 years.

DCE MRI's greatest predictive power was at 2 weeks. Image signal intensity proved to be the key variable. Patients whose signal intensity was in the lowest 10% at 2 weeks had a 16-fold increased risk of local recurrence. A residual tumor volume shown by DCE MRI to be in the upper 10% at 2 weeks also independently predicted local recurrence, conferring a 7.3-fold increased risk.

These DCE MRI risk factors were more potent than the traditional clinical variables. For example, positive nodal status was associated with a 6.8-fold increased risk of local recurrence, whereas a more advanced tumor stage conferred a 1.2-fold increased risk.

For prediction of disease-free survival, the clinical parameters showed 83% sensitivity and 68% specificity. The MRI parameters had 92% sensitivity and 68% specificity. The greatest predictive value came when the imaging parameters were employed in combination with the clinical predictors, with resultant 100% sensitivity and 82% specificity.

Asked whether she would change a patient's management in her clinical practice based upon the DCE MRI findings 2 weeks into therapy, Dr. Mayr replied, "I think at this point we dare to suggest that because the data are becoming more mature."

"There are many options," she said. "You could intensify the radiation dose with intensity-modulated radiotherapy or the more novel brachytherapy techniques. Or intensify the chemotherapy. Or if you still have a poor response at the end of treatment, I would even be so radical to say maybe we should have an exenteration at that point. So I think there are still things you can do," she said.

Discussant Gillian M. Thomas, M.D., immediate past president of the International Gynecologic Cancer Society, sought to place high-tech DCE MRI within the global picture of cervical cancer.

Cervical cancer has become a problem predominantly in developing countries. Although there are roughly 12,500 new cases per year in the United States, mainly in indigent and/or unscreened women, there are 100,000 new cases annually in China.

"There are 2,555 abstracts in your meeting program, of which only 38 relate to cervix cancer. So something's happening to cervix cancer research in the world of radiation oncology," observed Dr. Thomas, head of radiation oncology at Toronto Sunnybrook Cancer Centre.

"I'd like to remind you that while we're busy playing with our technology trying to get tiny gains, 55 countries in Africa don't even have a cobalt machine. So the future in cervix cancer is going to vaccines—that's a hugely exciting area," she said. ■